

Effect of the Accelerated School Construction Program on the Students' Academic Achievement in Public Secondary Schools of Rwanda

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Abstract: This research project entitled "Effects of the accelerated school construction program on the students' academic achievement in public secondary schools in Gasabo District, Rwanda" was guided with two specific objectives which are to evaluate the school facilities constructed in the accelerated school construction program and to evaluate the relationship existing between the accelerated school construction program and the students' academic achievement in public secondary schools in Gasabo, Rwanda. The total population of this study was composed of 165 from six selected secondary schools including head teachers and teachers in which a sample of 117 respondents was obtained by using Slovin's formula. Correlation research design was employed and IBM/SPSS version 21.0 was used to analyze data. The findings shown that the accelerated school construction program influences students' academic achievements at 50.1% of R-square. It was revealed that constructed schools, playgrounds as well as smart classroom indicates the accelerated school construction program implementation in public secondary schools as it was confirmed by 60 percent of teachers. It was also shown that there is a significant high positive correlation of 0.780 between accelerated school construction program and students' academic achievement and that every increase on accelerated school construction program implementation leads to effective academic achievement increase between 49.2 percent and 78.2 percent. The study recommends that educational authorities and superseding people should provide accelerated school construction program facilities and establish a well-coordinated maintenance plan of constructed school facilities which integrates each stakeholder's role. The researcher suggests that further research can be done to examine the influence of accelerated school construction program on students' academic performance in public secondary schools in Rwanda so as to come up with comparative analysis.

Keywords: School construction, Accelerated school construction program, Smart classrooms, Academic achievement.

1. INTRODUCTION

Globally, in all education schools, education does not occur in a vacuum; rather, it takes place in a setting that is well-structured and equipped with the physical resources and materials required for the learning process. The goal of school construction program in basic schools strives to increasing the regular students attendance at schools, boosting the staff motivation and improving scholarly accomplishment in the studies (Mokaya, 2013).

In Africa, the fast expansion in access to education has surpassed the growth trend in primary and secondary school classrooms which is often results in overcrowded classrooms. The student's enrolment rate had increased in schools and the actual number of classrooms so as to accommodate the present enrollment of students in basic education from forms 1-6 is still very low. Deliberately, the government took an initiative to develop a school construction program to ensure that every child in the country attains primary and secondary education for free (Kambuga, 2013).

According to (MINEDUC, 2022), one of the Rwandan top priorities as reflected by the ESSP 2018-2024 is to have "Strengthened modern school infrastructure and facilities across all levels of education in Rwanda" this is consistent with the agenda 2030 for Sustainable Development Goals, where by the SDGs highlights inclusive and equal access to high quality education promoting opportunities for lifelong learning. Based on the government's priority, modern schools are constructed to promote the modern education. The National Strategies for Transformation (NST1) includes to increase access to high-quality education and the welfare of teachers, with an emphasis on strategic investments in school construction at all levels of education (pre-primary, basic, and tertiary). The Rwanda auditor general's report of May 2016, in his performance audit on construction of school infrastructure for the period of January 2010 to December 2015, states that 2009 was the year in which the Ministry of Education initiated a program of school construction aiming at promoting education for all and accommodating effectively the growing figure of pupils at primary and secondary education levels. This program consists of the building of sufficient classrooms and related facilities like latrines, playgrounds, science laboratories, dormitories, dining halls, multi-purpose halls etc. The source founding to the program would be MINECOFIN through REB ordinary budget, community donations in cash and Umuganda as well as other partners; where the annual estimated budget amounted to 15 billion Rwandan francs for construction activities all over the country (OAG, 2016).

In the same respect, the Government of Rwanda accelerated the school construction program, whereby since 2016, the classrooms increased in number from 5110 in 2016 to 7626 in 2021 (MINEDUC, 2022) with the purpose to increase access to secondary education, to reduce the class size to the manageable number of students per teacher as well as to reduce the long distance made by some students to and from the school. According to the MINEDUC report of July 2020 on Environmental and Social Impact Assessment (ESIA), the goal of Rwanda's ongoing school construction program is to create a more conducive atmosphere for learning leading to quality students' academic achievement to primary and secondary students where approximately 11,000 classrooms were furnished. The continuous government initiative to lessen class overcrowding, which is currently of the utmost importance, is supported by the school construction program as well.

1.1 Problem statement

Generally, the students perform well when they are surrounded by an organized and comfortable learning environment which can boost positive behaviors (Ramlı et al, 2018). The school building and the educational process are closely related (Crook, 2006). However, in the most African countries, the student's academic achievement remains poor due to inadequate school buildings (Kerr, 2003). Rwanda is one of the top performing nations in education of sub Saharan Africa with 98 percent of children enrolled into elementary education but only 71 percent complete and the classrooms are too crowded with an average of 62 students per teacher. This indicates that the constructed schools are not enough for the needful quality education that can affects the enrollment of students in secondary schools (UNICEF report, 2022). Although a great step has been made to minimize the classroom overcrowding as it is indicated by the statistics on pupil-to-class ratio (PCR) showing an average of students per classroom in public schools where pupil teacher ratio stands at 45:1 compared to 58:1 in 2017 (*Education Statistical Yearbook*, 2022), the schools do not have sufficient classrooms to accommodate the enrolled students (RBA, 2020).

In response to these challenges and reason for overcrowding in classrooms, the Government of Rwanda, through the National Strategy for Transformation (NST1), the Green Growth and Climate Resilience Strategy and Vision 2050, has taken education infrastructures as priority and highlights the need for the expansion and modernization of school infrastructure through building more classrooms and new schools (MINEDUC, 2020). However, there is still a lack of information regarding on the effect of the continually increased construction of classrooms on learning outputs, especially on students' academic achievement. This paper is therefore sought to analyze the effect of the accelerated school construction program on the students' academic achievement in public schools of Rwanda, and is expected to contribute to the knowledge on how different factors are influencing educational outcomes.

1.2 Objectives

This study aimed at analyzing the effect of the accelerated school construction program on the students' academic achievement in public secondary schools in Rwanda and has specifically put emphasis on the assessment of the school facilities constructed in the accelerated school construction program and evaluation of the relationship between the accelerated school construction programme and the students' academic achievement in Public Secondary schools in Rwanda.

1.3 Significance of the study

This work aims at providing the clarity on how the improved school learning environment is a pertinent factor to be considered to ensure enhanced quality of education in general and improve students' academic achievement in particular. The study findings will determine the level to which the accelerated school building influences the students' academic achievement, which gives proper orientation to the Ministry of Education (MINEDUC) through its long- and short-term planning in order to strengthen the accelerated school construction program by allocating adequate budget and establishing a well-coordinated maintenance plan of constructed school facilities which integrates all stakeholders' roles (school leaders, teachers, parents, students and local community leaders).

2. REVIEW OF RELATED LITERATURE

In this section, the existing literature relevant to the research topic was examined. The theoretical literature, the empirical literature, theoretical framework and conceptual framework and the summary of the literature review were all included.

2.1 Theoretical literature

The literature review reveals different academic works that have been presented in relation to the research topic which is the effect of the accelerated school construction program on the students' academic achievement in public secondary schools in Rwanda.

Modern school facilities construction in public Secondary Schools

According to Rosmaizura (2018), the students who have access to quality standards facilities like smart classroom, library, playgrounds, laboratory equipment, and adequate seats in the classrooms perform well rather than those who do not have access on quality standard facilities. The research of Christopher, *et al.*, (2011) revealed that the main strategy through which federal, state, and local governments create physical capital in U.S. communities is the investment in school construction where since 2008, the Government spent more than \$58 billion in school construction and school land purchase which keeps increasing for achieving educational goals effectively.

In Kenya, the study conducted revealed that to enable conducive learning environment in which students learn effectively and efficiently, require the effort to build new adequate classrooms and rehabilitate the existing ones (McGuffey, 1982). This means that today's education system focuses on smart classroom concept as a great innovation and one-stop source for students needing analysis and technology. In fact, all schools must be smartly equipped to help students adapt to new technologies or concepts very quickly, which helps them integrate successfully in the professional world (Lall, et al.,2020).

In August 2019, the Government of Rwanda signed a financial agreement with World Bank with aim to initiate a large project regarding the school construction program expected to help Rwanda reduce overcrowding in classrooms and long distance taken by students from home to schools (MINEDUC, 2020). The Government of Rwanda, through its NST1, the Green Growth and Climate Resilience strategy and Vision 2050, has taken education infrastructures as priority and highlights the need for the expansion and modernization of school infrastructure through the construction of additional classrooms and new schools.

Academic achievement of students in public secondary School

The academic achievement is a wide - ranging field which in this study, is measured in terms of students' attendance, enrolment rate, course success, and credit accumulation (Pinkus, et al, 2009). Kenn F. (2001) stated that improved building conditions lead to higher student academic achievement for Australia. Many studies argued that the academic achievement of students is mostly restricted to the school and classroom related habits. Rutter et al (1979) in the conducted study, found that the maintenance of schools, decoration and classrooms were positively associated to higher students' achievement.

Different researchers consistently found a strong correlation between the school buildings' quality and academic outcomes (McGuffey et al., 2005; Schneider, 2002). It is noted that the student capability to attend and complete a learning program effectively in the learning depends on some influences. According to Berlak (2000), the process of teaching and learning is a two ways matter involving the teacher's presence as well as the students' attendance with active participation in the process. The students' attendance is, no doubt, the key factor for educational goals achievement.

Desirable school conditions lead to the increased rate of students' enrollment, attendance and completion and raise learning outcomes in secondary schools (McGowen, 2007). Contrarily, the poor school buildings are associated with negative student behaviors such as absenteeism, smoking, suspensions, class overcrowding, vandalism, and school dropout (Schneider, 2002). According to Ntawihwa et al. (2021), the quality of the education output on quality of education inputs where it is found that the school buildings play a significant contribution on the students' academic achievement.

Influence of accelerated school construction program on students' academic achievement

According to Komakech, (2015), there is a significant positive link between student attendance and completion rates, and academic achievement which affect positively or negatively the students and the school performance as well to achieve the set educational goals. Oselumese (2016), argued that the environment of the school including the classrooms, school location and settings, equipment, playgrounds and its technology has a great influence on the students' academic achievement such as rate of attendance, enrollment and completion among others.

The school environment with adequate buildings provide suitable learning experiences that enable students to acquire knowledge, skills, abilities and positive attitudes required to live a lifelong learning philosophy, competent of recognizing and resolving issues, and able to deal with changes (Chukwuemeka, 2013). In addition, the quality of the learning environment in schools determines the quality of learning outcomes (Cohen, 2010). Therefore, the environmental conditions have a great influence on the students' academic achievement. Aigboje (2005), stated that a well-constructed school is an important learning facility that promote learning in secondary education. Thus, improved learning outcomes. Oyesola (2007), argued that a number of available classrooms in the school reflects the population of the students and staff required. Therefore, McGuffey (1982), in the study conducted on the relationship between the school building conditions and students' performance on standardized tests, he stated that new school buildings and improved facilities have a significant role in improving the students' outcomes.

2.2 Empirical literature

According to Byiringiro (2015) who conducted the research on the influence of school physical infrastructure focusing on the items like classrooms, libraries, laboratories, and ICT infrastructure on students' academic performance in National Exams from 2011 to 2013, the obtained results indicated that the school infrastructure were not adequately sufficient and equipped to contribute to the student's academic performance which were measured in accordance with students' scores in National examination. Therefore, he made recommendations to stakeholders on how to construct suitable set-ups, maintain and keep them free from damage, dirt, and theft.

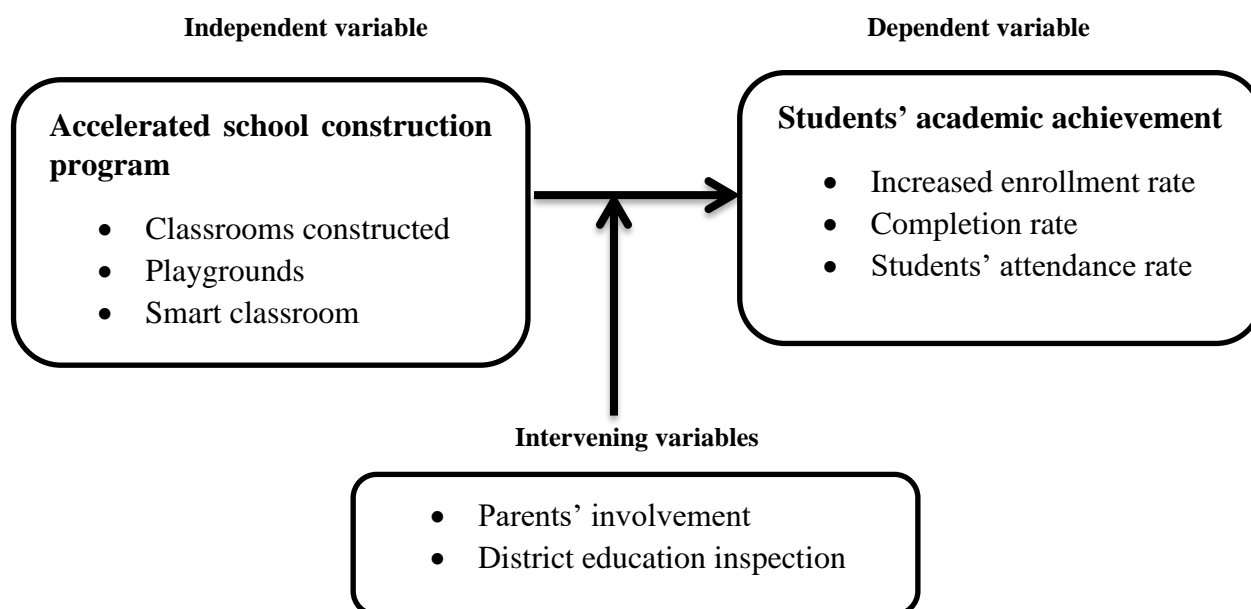
According to Paul (2015), the research conducted in Latin America on the school construction and education outcomes using survey questions and an interviewing schedule while gathering data, indicated that learning progresses and enrollment increases as a result of school libraries and new construction. The investigator also found that latrines enhance students learning so as to solve their individual needs, he also advanced an idea that the school laboratories and drinking water amenities encourage enrollment rate of the students.

2.3 Theoretical framework

This study was guided by the School Climate Theory introduced by Gregory in 2011. This theory indicates that there are different components that make up students' perceptions of their school environment. A school's learning environment is created by the interaction of a variety of factors including the academic activities, safety and institutional learning environment. Hence, a positive school climate allows a democratic expression by students. In the current study, the terms "school climate" and "school learning environment" are used interchangeably to represent the different school aspects that can exercise an impact on students' learning both directly and indirectly. Therefore, a conducive learning environment for students will enhance their academic performance, including their rate of enrollment, attendance, and completion, and vice versa (Gregory, et al., 2011).

2.4 Conceptual framework

This study was guided by the conceptual framework model to establish the relationship between the independent and dependent variables. However, the intervening variables such as parents' involvement and District school inspection may also impact the students' academic achievement.



Source: Candidate compilation

Figure 1

3. RESEARCH METHODOLOGY

The section covers the research design, sample design, target population, size of sample and sampling techniques. It also discusses the data collection methods and instruments used.

3.1 Sample design

Kothari (2004), declared that the research design is the conceptual structure within which the research is conducted; it constitutes the blueprint for the collection, measurement and analysis of data. This study was carried out by using descriptive survey design in which the researcher analyzed quantitative and qualitative data which were collected from the field and correlation research design which was used to establish the relationship between the accelerated school construction program and the students' academic achievement.

3.2 Sample size

From 165 targeted population including 6 school head teachers and 159 teachers from six selected public secondary schools in Gasabo District, a sample size was determined by using Solvin's formula ($n = \frac{N}{1+N(e)^2}$) with N standing for the population size equivalent to 165 and e standing for the margin of error (0.05) as follows: $n = \frac{165}{1+165(0.05)^2} = 117$

According to the formula, a sample size is equivalent to 117.

Table 3.1. Shows populace and proportioned sample size

Participants	Target group	Sample size
Head teachers	6	4
Teachers	159	113
Total	165	117

Source: Primary data (2022)

With regards to the aim of this research, the researcher purposively selected the population of the research in such way that 6 head teachers and 159 public secondary teachers were grouped into strata for achieving effectively and efficiently the data of the study.

3.3 Sampling techniques

In this research, a sample size from the targeted population was selected using the simple random sampling and purposive (goal-directed) sampling techniques. According to Lodico (2010), the intention of purposive sampling is to choose individuals, spaces, or objects that could deliver the maximum in-depth info to help in addressing the research questions. Due to the target of the research aiming at assessing the effect of accelerated school construction program on the students' academic achievement in public schools in Gasabo - Rwanda, the purposive sampling method was used to highlight the schools head teachers while simple random sampling technique was used to select teachers with consideration of public secondary schools in which the construction program was carried out.

3.4 Data collection tools

The questionnaires and interview guide that were used to collect data bearded two sections A and B. In both questionnaires and interview guide, section A comprises the respondents' background information while section B involves the forms composed of closed ended enquiries which were given to secondary teachers of public schools. The guided interview was provided to the school head teachers in order to get qualitative data that was added to the quantitative data from the questionnaire feedback. This facilitated the researcher collecting the needful data related to the effect of accelerated school construction program on the students' academic achievement in public schools in Gasabo district in Rwanda.

3.5 Reliability and validity of the research instruments

According to Carmins & Zeller (2005), the reliability of the study is defined as the extent to which the methods which are used during data collection should provide consistent results. To ascertain the reliability, a pilot study was conducted within 12 respondents by using Cronbach Coefficient Alpha. As the Cronbach Alpha is 78.3 percent which is greater than 70 percent, the researcher concluded that research is reliable while the validity refers to the ways in which instruments measure what are projected to measure (Orodho, 2004). To ensure the validity, in this study, the researcher consulted the supervisor and more experienced academicians. The questionnaires were also administered to the different respondents with proper measures that prevent collaboration while filling the questionnaires to ensure validity of the responses.

3.6 Data analysis procedure

In this study, the IBM/SPSS version 21 and Microsoft Excel 2010 was used to describe and interpret the results through tables, graphs, and chart. The correlation analysis and regression were used to know the relationship between variables. Thematic technique was used to analyze qualitative data from guided interviews by grouping into similar themes while the IBM/SPSS version 21 was used to analyze quantitative data from the respondents' questionnaires.

3.7 Ethical Consideration

To ensure its moral and ethical standing, school leaders, revised this research project. The researcher kept ethical value like being honest and objective as well as integrity during data collection. This was supported by an introductory letter from Mount Kenya University and recommendation letter from Kigali city so as to help respondents feel free from the study. The researcher made sure that everyone who should questioned is fully aware of their right to an explanation of the aims, procedures, purposes, and the consequences of the research. The confidentiality of the information provided by respondents was strictly upheld.

4. RESEARCH FINDINGS AND DISCUSSIONS

This section grants the research results, interpretations and analysis of data obtained from the respondents including the demographic characteristics of the respondents and discusses the purpose of the study. After a depiction of each of the result, an interpretation was given in the situation of the study built on the research objectives derived from research enquiries. Tables and graphs were used to demonstrate and recapitulate the research findings. After the demonstration of the research results, the recommendations were established.

4.1 Demographic Characteristics of the Respondents

The researcher has demonstrated the background of the respondents basing on their age, gender, marital status and academic qualifications. As the study was academically oriented, it was conducted in schools where the respondents were four school headteachers and 113 teachers were utilized in data collection related to the effect of the accelerated school construction program on the students' academic achievement in public secondary schools in Gasabo district, Rwanda.

4.2 Presentation of the findings

The findings of this research were presented based on the specific objectives of the study which were to assess the school facilities constructed in the accelerated school construction program in Public secondary schools and to evaluate the relationship between the accelerated school construction program and students' academic achievement in Public secondary schools in Gasabo District, Rwanda.

The extent to which the school facilities are constructed during the accelerated school construction program

The perception of teachers of public schools related to the degree to which the school facilities are constructed during the accelerated school construction program are shown in below table:

Table 4.2: Perception of teachers on the school facilities constructed during the accelerated school construction program

Statements	SD		D		N		A		SA	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
This school has enough classes	15	13.3	20	17.7	9	8.0	39	34.5	30	26.5
This school has a well-equipped smart classroom	12	10.6	18	15.9	6	5.3	53	46.9	24	21.2
This school has adequate playgrounds	13	11.5	30	26.5	13	11.5	47	41.6	10	8.8
Average	13.3	11.8	22.7	20.0	9.3	8.3	46.3	41.0	21.3	18.8

Source: Field data (2022), SD: Strongly Disagree, D: disagree, N: Neutral, A: Agree, SA: Strongly Agree

From the findings in relation to the first specific objective, 68.1% of teachers agreed that their schools have well-equipped smart classrooms, 61% agreed that their schools have sufficient classes and 50.4% agreed that their schools have adequate playgrounds.

In summary, 60% of teachers agreed that public secondary schools got school facilities including classrooms, playgrounds as well as smart classrooms through accelerated school construction program. However, school head teachers through guided interview indicated that the school construction program is implemented in the schools but some schools are still experiencing classrooms overclouding, thus insufficient classrooms.

This is in line with the research results of Maron et al. (2007) who argued that the school amenities like classrooms, libraries and laboratories improve corporal learning atmosphere that leads to the delivery of practical skills and to advance qualitative and appropriateness aspects that are desired in the school situation. The World Bank report (1999), revealed that the school building and renovating school amenities had a positive result on the students' presence rates. Khaemba (2007) also argued that the accessibility of effective playgrounds and class apparatus help the students to progress their talents. Thus, there is a need to effectively and efficiently allocate co-curricular facilities and also structure them properly for nurturing students' talents.

The relationship between the accelerated school construction program and students' academic achievement in Public schools

The study investigated the relationship between the accelerated school construction program and students' academic achievement in Public Secondary schools specifically in Gasabo district.

Table 4.3: Correlation between accelerated school construction program and students' academic achievement

Correlations			
		Students' academic achievement	Accelerated school construction program
Students' academic achievement	Pearson Correlation	1	.780**
	Sig. (2-tailed)		.000
	N	113	113
Accelerated school construction program	Pearson Correlation	.780**	1
	Sig. (2-tailed)	.000	
	N	113	113

** . Correlation is significant at the 0.01 level(2-tailed).

The findings presented in the above table indicated that there is a high positive correlation between the accelerated school construction program and students' academic achievement whereby Pearson coefficient of correlation states the correlation (r) of 0.780 with the p -value= $0.000 < 0.01$. This means that the accelerated school construction program provides plenty indication that encourage the students' academic achievement. As specified in interview, it was noted that the more school facilities provided, the more students' academic achievement improved.

These results are in line with the schoolwork of Broh (2002), which displays that scholars' learning in well-equipped schools in general is linked with an amended scholars' academic achievement. Adeyemo (2010), established that accelerated school construction program has proven to be advantageous in building and strengthening of students' academic achievement. The researcher revealed that enough school facilities leads to better students' academic achievement since increases the students' attendance, students' enrollment as well as completion rate.

Table 4.4: Coefficients of accelerated school construction program on students' academic achievement

	Unstandardized Coefficients		Standardized Coefficients		95.0% Confidence Interval for B		
	B	Std. Error	Beta	T	Sig.	Lower Bound	Upper Bound
Model 1 (Constant)	.670	.517		1.297	.197	-.351	.291
Classrooms construction	.212	.083	.162	2.538	.012	.047	.376
Availability of playgrounds	.637	.073	.586	8.682	.000	.492	.782
Availability of smart classrooms	-.123	.086	-.087	-1.427	.156	-.293	.047

Source: Field data (2022), a. Dependent Variable: Having effective academic achievement

The above table displays the role of each indicator in the inspiration of accelerated school construction program on students' academic achievement. It was found that availability of playgrounds contributes much in the influence of students' academic achievement while availability of smart classrooms contributes less. This shows that public secondary schools do not put more efforts in use of smart classrooms. The findings from the respondents indicated that there is evidence that the regression equation was well specified due to the fact that there was a substantial influence of playgrounds construction on students' academic achievement which was $p = 0.000 < 0.05$. the Conclusion was drawn that there is higher influence of accelerated school construction program on students' academic achievement. Thus, 95 percent assured that the scope of the actual reversion line is between 49.2% and 78.2%. This is followed by the encouragement of classrooms construction on students' academic achievement with significant level of $P = 0.012 < 0.05$ and the regression line is between 4.7 percent and 37.6 percent.

Head teachers of public secondary schools found in Gasabo district specified their discernments in relation to the impact of accelerated school construction program on students' academic achievement where they indicated that accelerated school construction program can affect students' academic achievement. In the case school leaders as well as teachers help students to use the provided school facilities effectively, students' attendance and the school completion as well as students' enrollment will increase. According to Massoni (2011), accelerated school construction program influence students' academic achievement such as school completion, positive aspects to become successful adults and social aspect.

5. CONCLUSION

The conclusion was drawn in accordance with analysis of the obtained results in consideration of the specified research questions which were formulated basing on the specific research objectives.

On the research question related to extent to which the school facilities have been constructed in the accelerated school construction program in Public secondary schools in Gasabo District, Rwanda, it was shown that classrooms, playgrounds and smart classrooms were constructed. The research findings shown that the implementation of the accelerated school construction program can affect students' academic achievement.

Basing on the research question related to the establishment of the relationship between the accelerated school construction program and students' academic achievement in public secondary schools in Gasabo – Rwanda, it was concluded that effective implementation of the accelerated school construction program influences students' academic achievement to the level between 49.2 percent and 78.2 percent.

6. RECOMMENDATIONS

The study was well conducted and the respondents provided their views on the effect of the accelerated school construction program on the students' academic achievement in public secondary schools. Therefore, after identifying the areas that need improvements the researcher has proposed the following recommendations:

Ministry of Education through its long and short-term planning, should strengthen the accelerated school construction program by allocating adequate budget in the program in order to solve overcrowding issue that impact the students' academic achievement.

There should be a balance among the school facilities constructed (classes, playgrounds and smart classrooms). Therefore, all stakeholders in the accelerated school construction program are strongly recommended to also increase the number of playgrounds so that the students' achievement may not be hindered by the insufficiency of any of school facilities.

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